INTERVIEW SUMMARY

Applicants would like to thank Examiner Nguyen for the courtesies shown them in the personal interview held on October 23, 2007. In attendance for the Applicants was Aaron Haleva, Esq., an attorney of record, and Dr. Luis Serra, an inventor. Dr. Serra demonstrated an exemplary embodiment of the invention. The Examiner and Applicants' attorney discussed the cited Chen reference, and agreement was reached that the independent claims would be amended to recite that the localization markers can be set, deleted and manipulated by a user while interactively viewing the data set, which would distinguish over Chen.

REMARKS

This Amendment, in connection with the following remarks, are submitted as fully responsive to the Office Action. Claims 1, and 22 have been amended. Claims 1, 22 and 26 are the independent claims. Favorable reconsideration is requested.

Claims 1-9, 11-18, 20-26 and 29-31 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,588,098 to Chen et al. ("Chen"). Claim 10 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Chen in view of U.S. Patent No. 6,826,297 to Sato ("Sato"). Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Chen in view of U.S. Patent No. 5,422,987 to Yamada ("Yamada"). Claims 27-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chen.

The method of claim 1, as amended, is directed to the interactive visualization of 3D models in a 3D data display. The method includes displaying data in a 3D data set in an

overview mode where localization markers can be set, deleted, manipulated and viewed, and displaying data in a local mode where, in response to user action, data in an interest region surrounding a localization marker are rendered using different display parameters than those of the overview mode. The localization markers can be set, deleted and manipulated by a user (which can include, for example, setting the size and shape of the region surrounding the localization marker within which 3D data is displayed in localization mode) while interactively viewing the data set at any point within the 3D data set.

As described in the specification, when interacting with a 3D data set or model it is often useful or desired to pay attention to a particular smaller region within the model space, wherein one or more of the models displayed therein have significant features. *Specification* at ¶ 6. When interactively visualizing such smaller regions it is often desired to display them with different display properties than those utilized in the standard viewing mode, such as, for example, higher magnification, greater resolution, shading effects, etc. *Specification* at ¶6. In general these different display properties consume a greater amount of system resources and it is not effective to apply them to all points in the model space. *Id.*

To facilitate this desirable feature the present invention allows a user to interactively set, delete and manipulate one or more localization markers at any point in the model space. This allows a user to view a large model, such as, for example, of a colon or other anatomical region generally and look for points or regions of interest ("overview mode"). After a set of such points or regions of interest has been obtained, the user can return to each of them and analyze them in greater detail, using different, and generally more detailed, display parameters ("local mode"). *Specification* at ¶27. This is precisely how, for example, medical practitioners examine volumized medical scan data, such as, for example, a CT of a colon, a

combined CT/MR of a brain, ultrasound of a liver, etc. An initial first pass is performed as a global or overall view wherein sites of interest are noted and recorded for later detailed analysis. Second, each recorded site of interest is examined in detail, for tumors or other abnormalities requiring diagnosis or evaluation. This precludes having to go back and find the sites of interest, or write them down, or having to implement some other process. The claimed method stores all the markers and allows a user to return to them whenever convenient.

It is critical to understand that given the medical applications of the claimed invention, the user must be able to arbitrarily set localization markers anywhere in the 3D data set. There can be no predefined objects or regions of the 3D data set that are to be displayed in localization mode. Users can load different 3D data sets all the time into an exemplary system that implements the claimed invention. The system has no knowledge of the contents of a given 3D data set, and thus recognizes no objects or linked sets of objects within it.

If a user was required to reset the local mode display parameters each time he moved to a new site of interest, this would not only be time consuming and tedious, but would frustrate him. Thus, the present invention allows a user to store a set of sites of interest and associated sets of display parameters for each. When the user returns to a given site of interest, such as, for example, by placing a virtual tool or cursor within a defined distance from a localization marker, the region surrounding the localization marker automatically displays the 3D data set according to user definable "local display parameters" within the region. The boundaries of the region are also definable and modifiable by a user.

Chen is directed to a method and apparatus for manipulating 3D objects on a computer display. Chen does not teach or suggest the method of amended claim 1. In Chen, the

objects to be manipulated are defined *a priori*. The system recognizes the various objects and the various bounding boxes provided that encompass each one, as well as where each bounding box's "active zones" are located. Thus, each such predefined object has an associated fixed and also predefined (as to its shape and extent) bounding box. Users cannot modify the shape and size of the bounding box, nor can they disintegrate a subset of a bounding box – say a single leg of the chair shown in Fig. 3, and make a new "object" out of it with its own active regions.

Throughout Chen what an object, and what the dimensions of the object's associated bounding boxes are, are never user defined or even modifiable. Each bounding box has a set of "sensitive areas" or "active zones" which can be selected and used to manipulate the object within the bounding box, as shown in Fig. 4. There is no teaching in Chen of a user deciding to abstract a part of an object, such as a leg of the chair shown in Fig. 3, and then create a new bounding box around it, such that the leg is displayed in a localization mode but the remainder of the chair is not.

This restriction is unacceptable in any medical imaging application, where ***etiology*** determines what -- and the shape and extent in 3D of -- what is viewed in greater detail, not an *a priori* decision by the system or programmer as to (i) what the size and expanse of a given *a priori* "object" is, and (ii) how that object can be displayed using pre-defined active zones at the edges of a pre-defined bounding box surrounding such fixed object. Claim 1 recites that the user can set, delete, manipulate and view localization markers in an overview mode, **while interactively viewing the data set,** at any point within the 3D data. Thus there is no *a priori* definition of objects, associated bounding boxes, or sets of objects that can be viewed individually or as a group.

Response to Examiner's Response to Applicants' Arguments

In the "RESPONSE TO APPLICANT'S ARGUMENTS" at page 3, the Office Action reads the fact that in Chen individual objects could be selected from a larger set of objects (for example, a chair from a room full of furniture), at 19:31-33 as teaching the use of a localization mode. Applicants respectfully traverse. Again Chen here speaks of *a priori* defining a set of objects that can be manipulated at an individual level or at a group level:

> Providing a bounding box which is not of equal size with the dimensions of the object to be manipulated provides further capabilities. For instance, if the user wished to manipulate multiple objects as a single group, a reduced size bounding box based on a space size which encompasses all of the objects desired to be included in the group could be used. Stated differently, objects (for instance furniture in a room or scene) could be individually selected thus providing a finite sized bounding box. This embodiment would thus provide object manipulation. Alternatively, a scene of objects (for instance a room containing furniture) could be selected thus again providing a finite sized bounding box, albeit reduced in size to provide user access to all of the available manipulations, but one which properly acts as if it encloses all of the objects which are included in that scene.

Chen at 19:25-40.

The "objects" described here in Chen are whole and complete pieces of furniture. They can be manipulated together as a group or each individually, but a user cannot interactively decide to make a leg of one chair and a portion of a surface of a table as together defining a new "object," draw a bounding box around it, and manipulate those disparate pieces as a unit distinct from the rest of their respective structures. Nor can a user pick an arbitrary point and tell the system to treat that as a marker and thus display a defined region around such marker (of various user defined shapes and sizes) in a local mode in response to user action. Chen simply does not contemplate drawing a bounding box around less than a complete object. Moreover, an *a priori* set of instructions has to exist in Chen to provide for an embodiment where such a "bounding box which is not of equal size with the dimensions of the object to be manipulated" is provided.

The claimed invention has none of these limitations or restrictions.

For at least these reasons, claim 1 is respectfully asserted as patentable over Chen. For similar reasons independent claims 22 and 26, which recite similar features, are also urged as patentable over Chen.

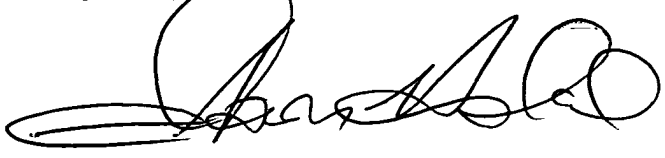
Neither Sato nor Yamada is seen by Applicants as curing the defects of Chen as a reference against the independent claims, whether taken alone or in combination. Thus, dependent claims 2-21, 23-25 and 27-31 are also urged as patentable over Chen, Sato and Yamada, whether alone or in any combination.

If any questions remain as to the patentability of the pending claims, Applicants respectfully request the opportunity to have a follow-up interview with the Examiner, review any issues and hopefully resolve them. The Examiner is thus invited to notify Applicants' undersigned attorney if such questions remain so that an interview can be scheduled.

No additional fees are believed due herewith. If any additional fees are due, the Commissioner is hereby authorized to charge any fee deemed necessary for the entry of this Amendment to Deposit Account No. 50-0540.

Dated: January 17, 2008

Respectfully submitted,



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